R E M A R K S

Amendments to the specification

The specification has been amended as indicated above, to correct readily identifiable typographical errors. For example, the description of Figure 3a has been amended to correctly recite "ohmic current/voltage" and to more accurately describe the experimental results depicted. The descriptions of Figures 3b-3e and Figure 4 have been corrected to recite "current density/voltage." The nature of these typographical errors in the specification and proper correction thereof would be readily evident to one skilled in the art reading the specification. As such, correction of these errors does not represent new matter or raise new issues for consideration.

Amendments to the drawings

Figure 3a has been amended to replace the Y-axis with nomenclature standard for the U.S. Figures 3b-3e and 4-6 have been amended to correct the labeling of the Y-axis. Specifically, "CURRENT (A/cm^2)" has been replaced with "CURRENT DENSITY(A/cm^2)". The nature of the error in the axis label of the Y-axis is evident from the units used with the axis and the description of the Figures and data in the text of the specification. As such,

correction of these typographical errors in no way represent new matter or raise new issues for consideration by the Examiner.

Rejections under 35 U.S.C. §102(b) and 103

Claims 1 and 5-20 have been rejected under 35 U.S.C. §102(b) as being anticipated by Cao (U.S. Pat. No. 5,965,281). Claims 10 and 21 have been rejected under 35 U.S.C. §103 as being obvious over Cao (U.S. '281) combined with Yu et al. (U.S. Pat. No. 6,441,395). In the Advisory Action of October 22, 2003, the Examiner maintains that the device shown in Figure 15 of Cao meets all of the features recited in claim 1 of the present application. Thus, the Examiner appears to take the position that even though the device of Cao may be disclosed as a light-emitting diode, the device depicted in Figure 15, could be used as a rectifying diode of the invention because all of the recited layers of claim 1 are present in Figure 15. Applicants traverse this rejection and withdrawal thereof is respectfully requested.

The device of Cao is a light-emitting diode having transparent electrodes. Since the present invention is not a light-emitting device, the present invention does not use transparent electrodes, such as ITO or ITO combined with the gold in the anode, which would be detrimental to the use of conducting polymer in order to improve the charge injection.

As noted above, the Examiner equates the light-emitting diode of Figure 15 of Cao with the rectifying device according to the present invention. Specifically the Examiner finds that Figure 15 of Cao shows two layers 16, which according to the Examiner are "equated to the third semiconducting layer of the invention".

It should be noted that Cao specifically mentions the use of poly(p-phenylene vinylene) and its derivatives as the electrically active, i.e. semiconducting polymer, forming the light-emitting material of his invention. The active semiconducting polymer of Cao, however, differs from that of the present invention in comprising an additive of a polarizable substance as stated in Cao, col. 5, lines 50-54. As discussed in col. 7, line 37 through col. 9, line 27 Cao underscores that it is the additive that serves to make his invention completely different and distinct over the prior art. For example, Cao state in col. 5, lines 54-59,

> where an electron-transporting reagent with relatively high electron mobility was based between the active, e.g. electroluminescent polymer and the cathode or an electron-transporting reagent was blended into the electroluminescent polymer.

The Examiner contends that Figure 15 of Cao shows two layers 16. However, Cao specifically states in col. 6, lines 25-28 "Active layer 16 which is an electronically active organic polymer admixed with additive has a polymer grid 24 imbedded with it with the active polymer passing through the grid". In other words, layer 16

in Figure 15 is one and the same layer and extends through the embedded layer of conducting polymer, i.e. the polymer grid 24.

There is nothing similar to this feature in the present invention, and it is clear from Cao, col. 6, lines 28-33 that "This grid is conductive and can be a source of electrical signal output, or if a grid voltage is applied to it can alter the electrical characteristics of the device in the manner of a grid voltage in a classic vacuum tube triode".

The Examiner notes that Cao further recite in col. 6, lines 12-14 and in Example 7, "Because of the presence of the additive in the electroluminescent layer, cathode 18 can be formed of a high work function metal and still provide good efficiency". However, this disclosure is irrelevant to the present invention wherein the object is an anode with as high a work function as possible and a cathode with a much lower work function so as to make the difference between the two as large as possible. Aluminum, which is a preferred electrode metal, has a fairly high work function of about 4.2 electron volt, when compared to other base metals. However with the present invention, an advantageous combination with a conducting polymer in the anode serves to furnish the anode with the desired high work function and has the added advantage being possible to achieve a rectifying device with aluminium as the electrode metal both in the anode and the cathode.

Figure 1 of Cao relates to Example 1 of the reference and indicates that the rectification ratio approaches 10^4 at the cited operating voltage. In Figure 1, of Cao +/- 6 volts gives a rectification ratio of about 20,000. However, with the present invention at 6 volts it is possible to achieve a rectification ratio of 10^7, i.e., about three orders of magnitude better than the prior art devices.

In summary, the device disclosed by Cao in Figure 15 is a light-emitting diode with a triode structure, i.e. a third electrode in the form of a conducting polymer grid embedded in the semiconducting or active polymer layer. Moreover, Cao uses a transparent anode layer, which cannot be present in the present invention. Thus, the device of Cao, i.e. a light-emitting triode, is structurally different from the present invention which is a rectifier diode with high rectification ratio. The structural differences between Cao and the invention result in a functional difference, i.e. a light-emitting diode with high luminance and possibly also a high quantum efficiency in the case of Cao and a rectifying diode with a high rectification ratio with the invention.

As such, the present invention is neither anticipated by nor obvious over the cited prior art and withdrawal of the rejections is respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact MaryAnne Armstrong (Reg. No. 40,069) at the telephone number of the undersigned below.

Applicants request a three (3) month extension of time for filing the present response. The required fee of $950.00 is submitted with the concurrently filed Notice of Appeal.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Replacement sheets for Figures 3a-3f and 4-6.